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AMBIENT AIR QUALITY MONITORING PLAN

WIDOWS CREEK STEAM PLANT

AIR RESOURCES PROGRAM

TVA/ONR/ARP-81/14

TENNESSEE VALLEY AUTHORITY

Office of Natural Resources

Air Resources Program

AMBIENT AIR QUALITY MONITORING PLAN

WIDOWS CREEK STEAM PLANT

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CONTENTS

	Page
Introduction	1
Background Information	3
Approach	9
Objectives for Air Quality Monitoring	11
Methods	13
Modeling	13
Ranking Site Effectiveness	14
Discussion of Results	15
Modeling	15
Ranking of Effectiveness	17
Proposed Network	23
Appendix A - Alabama Air Pollution Control Regulations and Letters from EPA Approving TVA SO_2 and TSP Monitoring Methods	27

TABLES

		Page
1.	SO_2 Monitoring Data - Widows Creek Steam Plant January 1, 1978 - December 31, 1979	19
2.	Ranking of the Effectiveness of Ambient Air Monitoring Stations in the Vicinity of the Widows Creek Steam Plant January 1, 1978 - December 31, 1979	21
3.	Monitoring Objectives Achieved by the Proposed Network.	25

FIGURES

1.	Plant Operating Level - Widows Creek Steam Plant, 1975-1979	4
2.	SO_2 Emissions - Widows Creek Steam Plant, 1975-1979.	4
3.	Existing Ambient Air Quality Monitoring Network at the Widows Creek Steam Plant	5
4.	Maximum and Second Highest 3- and 24-Hour Average SO_2 Concentrations Measured at Stations in the Widows Creek Steam Plant Monitoring Network 1975-1979	6
5.	Areas of SO_2 Affected Vegetation in the Vicinity of the Widows Creek Steam Plant	7
6.	Modeled Maximum 3- and 24-Hour SO_2 Concentration Impact Points in the Vicinity of the Widows Creek Steam Plant	16
7.	The Percentage of Time Existing Monitors Were Downwind of the Widows Creek Steam Plant - January 1, 1978 - December 31, 1979.	18
8.	Location of stations in the Proposed Ambient Air Quality Monitoring Network at the Widows Creek Steam Plant	24

AMBIENT AIR QUALITY MONITORING PLAN

WIDOWS CREEK STEAM PLANT

Introduction

TVA has conducted ambient air quality monitoring in the vicinity of Widows Creek Steam Plant since 1950. The monitoring network was operated to collect background air quality information prior to plant startup (1952) and for documenting ambient air quality levels after the plant reached full operating levels in 1965.

In 1976, TVA sought to bring the steam plant into compliance with provisions of the Clean Air Act by meeting applicable ambient air quality standards for sulfur dioxide (SO_2). While this option was not specifically extended to TVA under the then existing Alabama State Implementation Plan, it was selected by TVA as being the most practical means of meeting ambient air quality standards.

TVA's strategy for meeting ambient standards was by implementation of its Sulfur Dioxide Emission Limitation (SDEL) Program. The program originally provided for the control of plant emissions when meteorological conditions in the area conducive to ambient SO_2 concentrations in excess of applicable ambient standards existed or were anticipated. This system uses data from ambient SO_2 monitors to determine whether standards are exceeded and to upgrade program effectiveness.

The SDEL program has operated continuously at Widows Creek since its implementation in 1976. It was integrated into the Consent Decree interim control plan in 1978 for the purpose of minimizing violations of both SO_2 and particulate standards until such time as the plant met applicable emission standards. The consent decree stipulates that the plant must meet SO_2 and particulate standards by September 1981.

In order to meet the SO_2 emission standard of 1.6 $lb/10^6$ Btu for units 1-6, low-sulfur coal will be utilized. Limestone scrubbing will be utilized on units 7 and 8 to meet the SO_2 emission standard of 0.9 $lb/10^6$ Btu. Emissions from all units will be adjusted if necessary to achieve a total plant SO_2 emission rate of 1.2 $lb/10^6$ Btu.

There are regulations that require TVA to conduct ambient air monitoring at Widows Creek Steam Plant. Alabama Air Pollution Control Commission Regulations (dated February 13, 1980) empower that agency to direct source owners to perform ambient air quality monitoring. The regulations (chapter 5 - Control of Sulfur Compound Emissions), state that "every owner or operator of a fuel burning installation having a total rated capacity greater than 1500 million BTU per hour shall:

(a) Demonstrate, to the satisfaction of the Director, that the sulfur oxides emitted, either alone or in contribution to other sources,

will not interfere with attainment and maintenance of any primary or secondary ambient air quality standard prescribed at part 1.6." and

"(c) Upon the direction of the Director, install and maintain air quality sensors to monitor attainment and maintenance of ambient air quality standards in the areas influenced by the emissions for such installation. Results of such monitoring shall be provided to the Director in a manner and form as he shall direct."

Appendix A contains these Alabama regulations in their entirety and letters from EPA which approve TVA's methodology for measuring SO_2 and total suspended particulate (TSP). Since TVA has voluntarily complied with the intent and purpose of these regulations, the State agency has not considered it necessary to officially direct TVA to conduct ambient monitoring.

The purpose of this monitoring plan is to present a new network design for Widows Creek Steam Plant.[1]

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1. All TSP monitors will be collocated with SO_2 monitors to document ambient TSP levels that are attributable to steam plant stack emissions.

Background Information

To determine the current status of air quality conditions at Widows Creek Steam Plant, a review was made of operating loads, emissions data, air quality data, and other related information for the period 1975-1979.

The Widows Creek Steam Plant consists of eight pulverized coal-fired units. The plant is divided into two sections located approximately 250 meters (m) apart. The original plant contains six small units of 145 megawatts (MW) each and is served by a common 304-m stack. The other section of the plant contains two units; one 575 MW (unit 7) and one 550 MW (unit 8), each of which is served by a 152-m stack. The average monthly electrical generation rates at Widows Creek Steam Plant for the years 1975-1979 are shown in figure 1. During this period the plant produced between approximately 500 and 900 MW monthly. The daily average SO_2 emissions by month from the Widows Creek Steam Plant are shown in figure 2. During this period, emissions varied between about 200 and 800 tons/day.

The maximum and second highest 3- and 24-hour SO_2 concentrations measured in the vicinity of Widows Creek Steam Plant (figure 3) for 1975-1979 are shown in figure 4. The sharp decline in excessive ground-level SO_2 concentrations that occurred in 1978 was primarily attributable to installation of an SO_2 scrubber on unit 8, a taller stack (304 m) to serve units 1-6, and reduced sulfur content in coal (2.1 percent in 1978 vs. 2.9 percent in 1979).

Botanical surveys were conducted during the 1975 through 1979 growing seasons (May-September), to determine if SO_2 emissions from Widows Creek Steam Plant had visibly affected vegetation.[2] Areas where SO_2 effects were observed on sensitive vegetation during each of the five years are shown in figure 5.

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2. Survey reports are available upon request.

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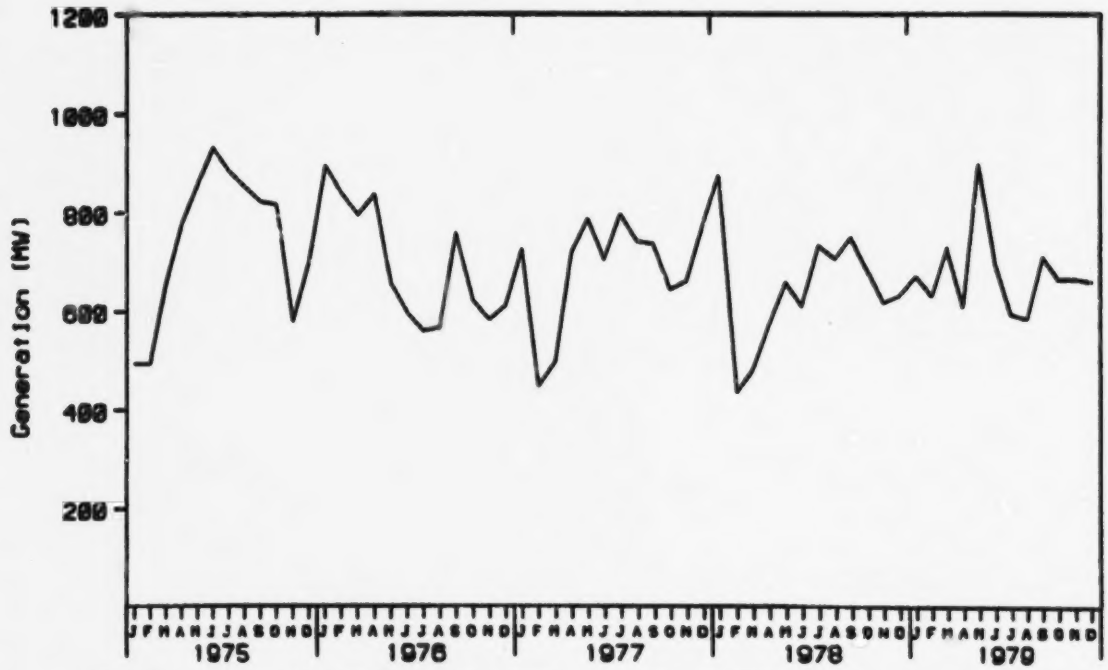

Figure 1. PLANT OPERATING LEVEL - WIDOWS CREEK STEAM PLANT 1975-1979

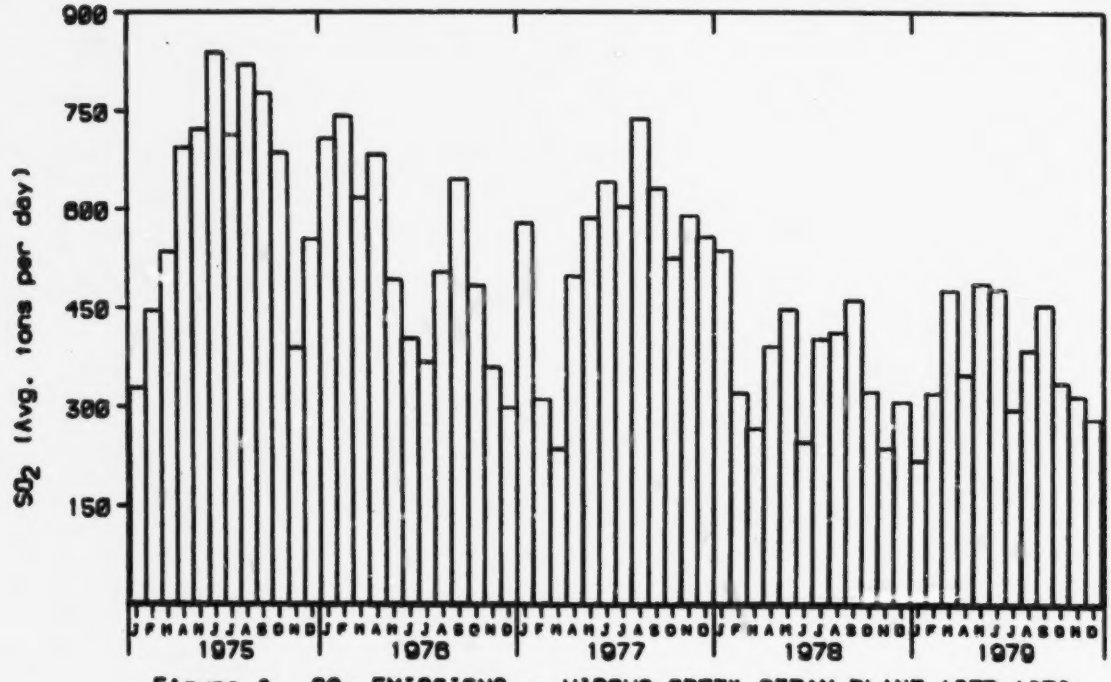

Figure 2. SO_2 EMISSIONS - WIDOWS CREEK STEAM PLANT 1975-1979

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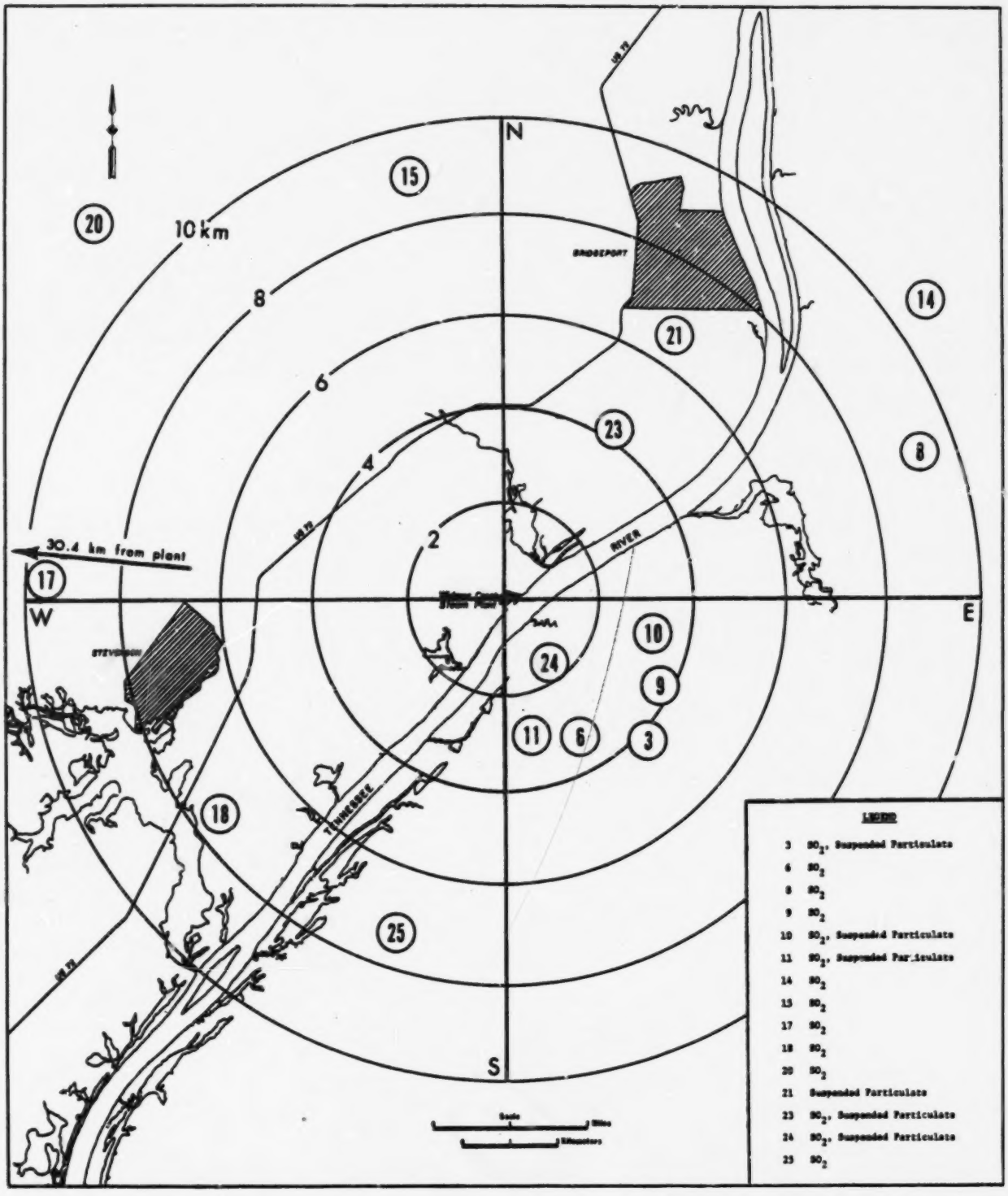

Figure 3. EXISTING AMBIENT AIR QUALITY MONITORING NETWORK AT THE WIDOWS CREEK STEAM PLANT

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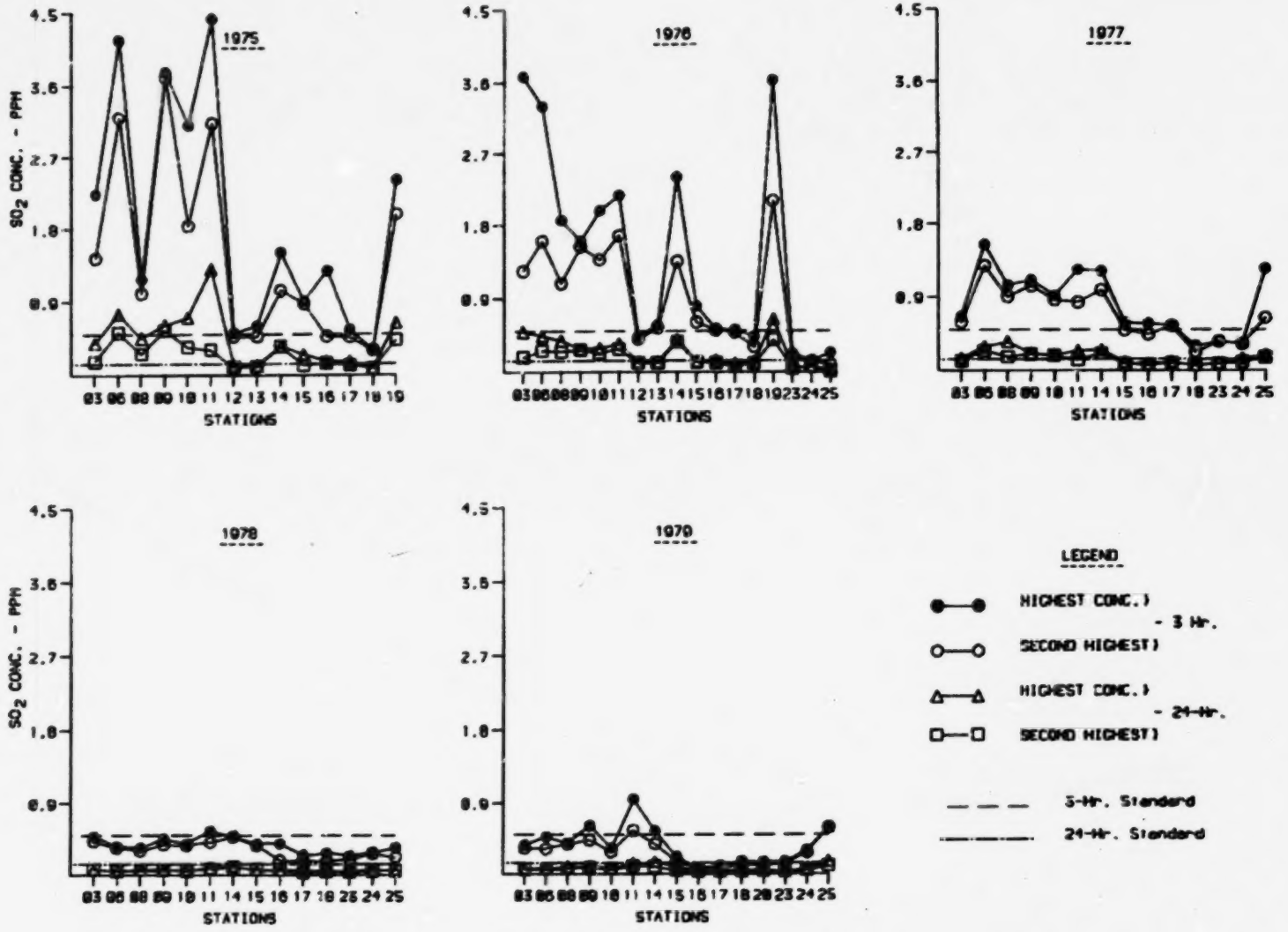

Figure 4. MAXIMUM AND SECOND HIGHEST 3- AND 24-HOUR AVERAGE SO_2 CONCENTRATIONS MEASURED AT STATIONS IN THE WIDOWS CREEK STEAM PLANT MONITORING NETWORK 1975-1979

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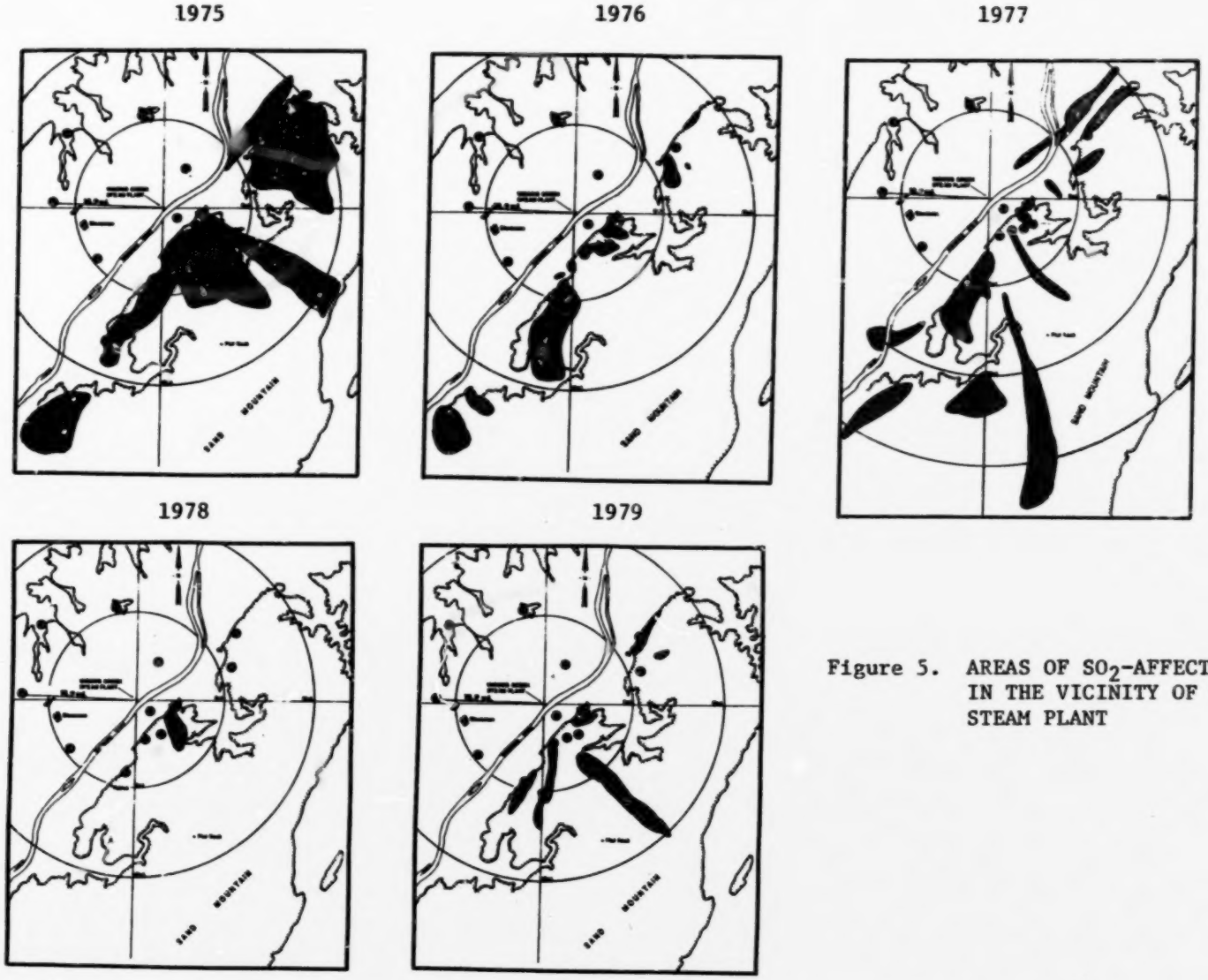

Figure 5. AREAS OF SO_2-AFFECTED VEGETATION IN THE VICINITY OF WIDOWS CREEK STEAM PLANT

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Approach

The development of a network design for Widows Creek involved the following steps.

1. Objectives were identified, evaluated, and defined in terms of present and future needs and requirements.

2. A modeling analysis was performed to identify sites where highest SO_2 concentrations may be expected to occur with some frequency under various atmospheric conditions.

3. All pertinent air quality, metecrological, plant operating, and botanical effects data were evaluated to determine which existing monitoring stations were most effective in documenting ambient levels.

4. After an evaluation was made of the information compiled in steps 1 through 3, judgments were made about which stations would best satisfy monitoring objectives.

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Objectives for Air Quality Monitoring

TVA conducts ambient air quality monitoring in the vicinity of Widows Creek to determine the impact of its gaseous and particulate emissions and to determine compliance with standards. The primary and secondary objectives are as follows:

A. Primary Objectives

1. Monitor in areas expected to receive high 3- and 24-hour SO_2 concentrations with significant frequency.

2. Monitor in areas expected to receive high 24-hour TSP concentrations.

TVA also conducts its monitoring to meet the following additional, although less constraining, objectives when possible to more adequately characterize air quality conditions.

B. Secondary Objectives

1. Monitor in the areas of combined impact from the TVA plant and other major air pollution sources.

2. Monitor to obtain overall area coverage of pollutant levels.

3. Preferentially monitor in populated areas over nonpopulated areas.

In selecting monitor site locations, primary objectives were met, and secondary objectives were met when practical.

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Methods

Modeling

Predictions of ambient SO_2 concentrations in the vicinity of Widows Creek were made using COMPTER, a steady-state dispersion model developed by the Alabama Air Pollution Control Commission (AAPCC). The model is largely based on the Single-Source (CRSTER) model developed by EPA but has been modified to predict pollutant concentrations in complex terrain more realistically. In particular, COMPTER was adjusted by AAPCC to improve agreement between predictions and measurements of air quality at Widows Creek based on 1976 data.

Modeling was carried out for a plant configuration consisting of a 304.8-m stack serving units 1-6, and two 152.4-m stacks serving units 7 and 8. Units 1-6 were assumed to emit SO_2 at a rate of 1.6 $lb/10^6$ Btu because of low-sulfur-coal combustion. Units 7 and 8 were assumed to emit at a rate of 0.9 $lb/10^6$ Btu because of flue-gas desulfurization. Predictions were made for three levels of plant output--50, 75, and 100 percent generation capacity. The influence of the Mead Corporation paper plant, located 3.5 km southwest of Widows Creek, was not directly taken into account in the modeling, but was considered relative to monitor placement in the valley very near Widows Creek.

One year of meteorological data was used to carry out the modeling. This was obtained from the 61-m valley meteorological tower near the steam plant for the year 1976. Missing data and stability class determinations were based, as needed, on observations made by the National Weather Service (NWS) at Huntsville, Alabama. Mixing height data were estimated from NWS soundings taken at Nashville, Tennessee.

A receptor grid was selected that extended nearly 30 km from Widows Creek. The receptor selection followed a polar-coordinate pattern of 1.0 to 10.5 km from the plant. Additional receptors were located in areas where preliminary analyses had shown high concentrations would be predicted. Between 10 to 30 km, receptors were selected on high terrain to provide adequate circumferential coverage of the area.

Model predictions were analyzed for frequencies of occurrence of concentrations above given thresholds. The threshold chosen for 3-hour averages was 0.10 ppm--a value that is about about half the "average" maximum 3-hour-average concentration predicted by the model for the 75 percent generation level of the plant. For 24-hour averages, the threshold was chosen to be 0.02 ppm--a value that is also about half of the "average" maximum 24-hour-average concentrations predicted for 75 percent generation level. For each receptor, a count was made of the number of times the threshold was exceeded. This number was plotted on a map at the location of the receptor, and lines of approximately equal frequency were sketched in. In this manner, the areas of highest frequency were delineated.[3]

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3. A more extensive discussion of the modeling analysis for Widows Creek Steam Plant is presented in a separate Air Resources Program report, which is available upon request.

Ranking Site Effectiveness

An evaluation scheme was developed to rank existing air monitoring stations with regard to their effectiveness in promoting the primary monitoring objectives. Only data for the period 1978 and 1979 (during which units 1-6 operated on the 304-m stack) were used in the ranking scheme. To determine ranking values, individual factors were assigned various weights (depending upon their importance) which were used to calculate numerical values for each station. Weighted values were subsequently totaled and stations were ranked according to their numerical value.

Stations were ranked according to the following factors:

A. An important factor was the magnitude of the average level of the measurements (in terms of the maximum and second highest 3- and 24-hour SO_2 concentrations) made at each monitor from 1978 through 1979. The station with the lowest and the station with the highest average SO_2 concentration for each of these factors during the two-year period was assigned 0 and 15 points respectively, with intermediate stations receiving weighted values in proportion to their average levels.

B. A factor that was considered of equal importance was the frequency that 3- and 24-hour average SO_2 concentrations were recorded in excess of a significant level from 1978 through 1979. Base levels of 0.15 and 0.040 ppm respectively were established by taking the highest value exceeded at each station at least once during the period. These values were used since they provided the largest "spread" of points from top station to bottom station. The station with the lowest average frequency was assigned 0 points, and the station with the highest 15, with other stations receiving weighted values in proportion to their average values.

C. Equally important was the measurement of exceedances of the 3- and 24-hour National Ambient Air Quality Standards (NAAQS) during the period 1978 through 1979. The station that recorded the greatest number of exceedances was assigned 15 points with the remaining stations receiving weighted values in relation to the number of times they recorded these concentrations. Those stations where no standard exceedances were recorded received 0 points.

D. An additional factor was whether a station was located in or near (within 1 km) areas where SO_2-affected vegetation was observed during the study period. A station located in or near such areas the greatest number of times was assigned 15 points. Remaining stations received weighted values proportional to the number of times they were in or near those areas.

E. Lastly, the location of a station in a predominantly downwind sector from the power plant (1978-1979) was also considered an important factor in determining monitor effectiveness. Although this factor is not directly associated with the time period and severity of SO_2 concentrations impacting a monitor, the probability of such an occurrence is enhanced. In rating this factor, monitors downwind the greatest percentage of time were assigned a maximum of 10 points and those downwind the least percentage 0 points, with subsequent monitors receiving weighted values proportional to their downwind percentages.

Discussion of Results

In determining the number and configuration of stations in the network for Widows Creek Steam Plant, modeling was given considerable weight in the final selection.

Modeling

Modeling results are shown in figure 6. The shaded areas are those that, from a modeling viewpoint, are likely to measure relatively high concentrations quite frequently. Areas designated as candidate sites for measuring 24-hour averages could be expected to experience maximum concentrations up to about 0.05 ppm. In figure 6, these are indicated by cross-hatching. These areas largely coincide with several areas where higher 3-hour averages are expected frequently. Besides such areas on Sand Mountain, an elevated area about 27-28 km southwest of the plant appears to be an excellent location for documenting higher concentrations (both 3- and 24-hour averages) during the frequent down-valley flows during nighttime, stable meteorological conditions. However, there are a number of areas where monitors could be placed with primary emphasis on measuring 3-hour averages. These are: (1) the mountain overlooking South Pittsburg, Tennessee, (2) a pair of areas about 23-25 km southeast of the plant, and (3) a pair of areas within about 3 km from the plant (see the inset in figure 6). Maximum 3-hour averages could be expected up to about 0.3 ppm. In figure 6 candidate sites for 3-hour-average measurement are indicated by stippling.

The areas mentioned in (2) are recommended for documenting concentrations at more remote regions of Sand Mountain. The areas mentioned in (3) are desirable for documenting concentrations resulting from dispersion of Widows Creek emissions during unstable dispersion conditions. Of the three areas shown in the inset of figure 6, the area southwest of the plant is more desirable because it lies between the Widows Creek and Mead Corporation facilities. A monitor in such an intermediate position could record impacts of each plant without simultaneous interference from the other. However, a second monitor placed at the west end of the area to the north of the plant would approximately double the probability of capturing high concentrations resulting from dispersion in unstable meteorological conditions and would also provide documentation of terrain-induced plume downwash that has been observed about 1.3 km from the plant in a direction perpendicular to Sand Mountain.

In addition, there are areas near the Sand Mountain escarpment that are likely to be suitable sites but which were not identified by modeling because of the choice of valley-tower meteorological data for model input. An analysis of mountain-tower data suggests that, had such data been used, candidate sites not included in the shaded areas of figure 6 would have been indicated along the edge of Sand Mountain. Thus, locations almost anywhere along the Sand Mountain plateau rim would very likely be useful monitoring sites.

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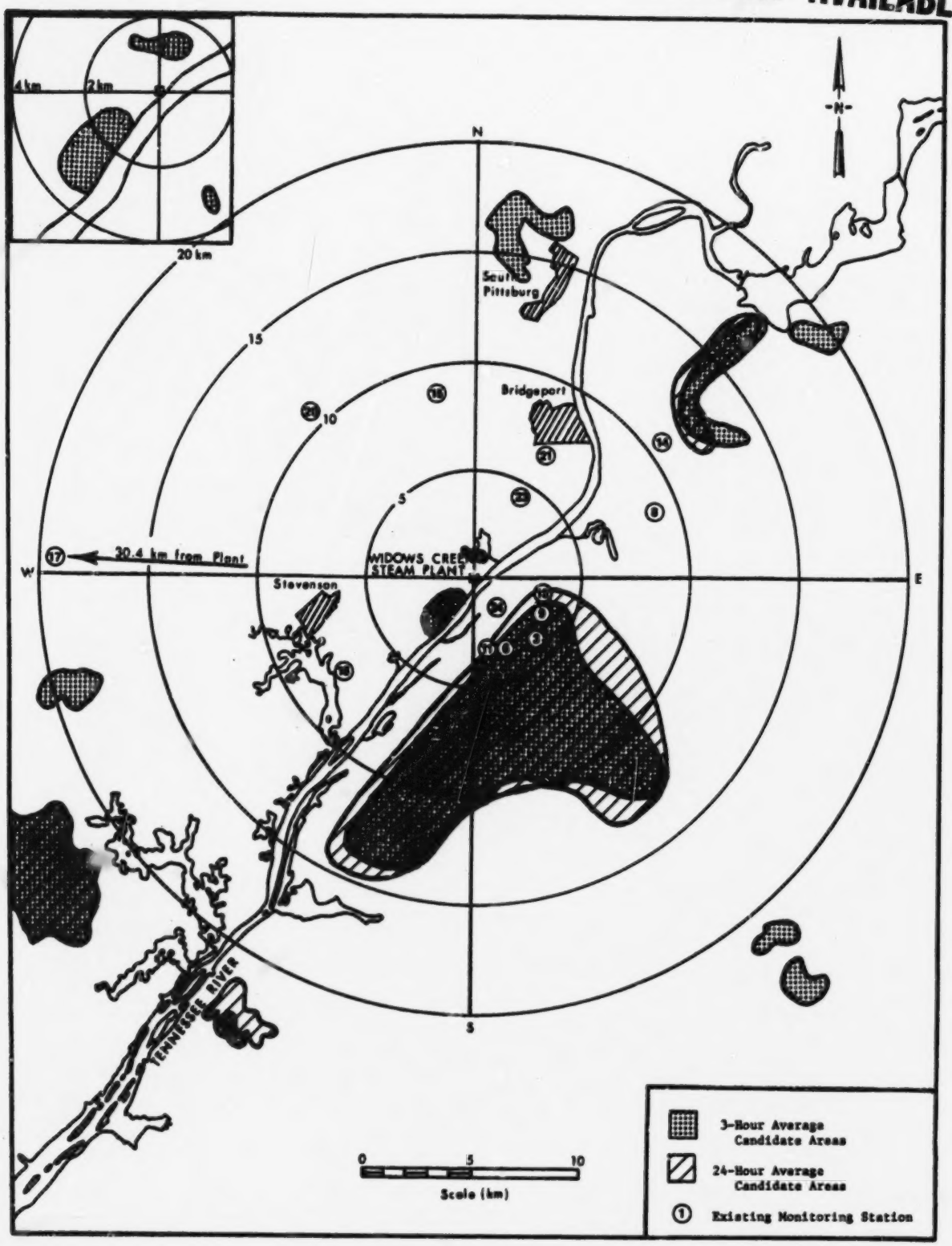

Figure 6. MODELED MAXIMUM 3- AND 24-HOUR SO_2 CONCENTRATION IMPACT POINTS IN THE VICINITY OF THE WIDOWS CREEK STEAM PLANT

Ranking of Effectiveness

Existing air monitoring stations in the vicinity of Widows Creek Steam Plant were evaluated according to the five factors described in the "Methods" section. Weighted values were assigned each station in relation to the magnitude and frequency of SO_2 levels recorded, number of NAAQS excesses, proximity to areas of SO_2 affected vegetation, and downwind percentages as shown in figures 5 and 7 and table 1. Values assigned each monitoring station were totaled, and stations were ranked according to their resulting numerical value (table 2). Station 14 scored highest in the ranking scheme followed by stations 11, 9, 25, 3, 8, and 10. Since the steam plant only operated for two years (1978-1979), in the present configuration, only these data were used to rank station effectiveness.

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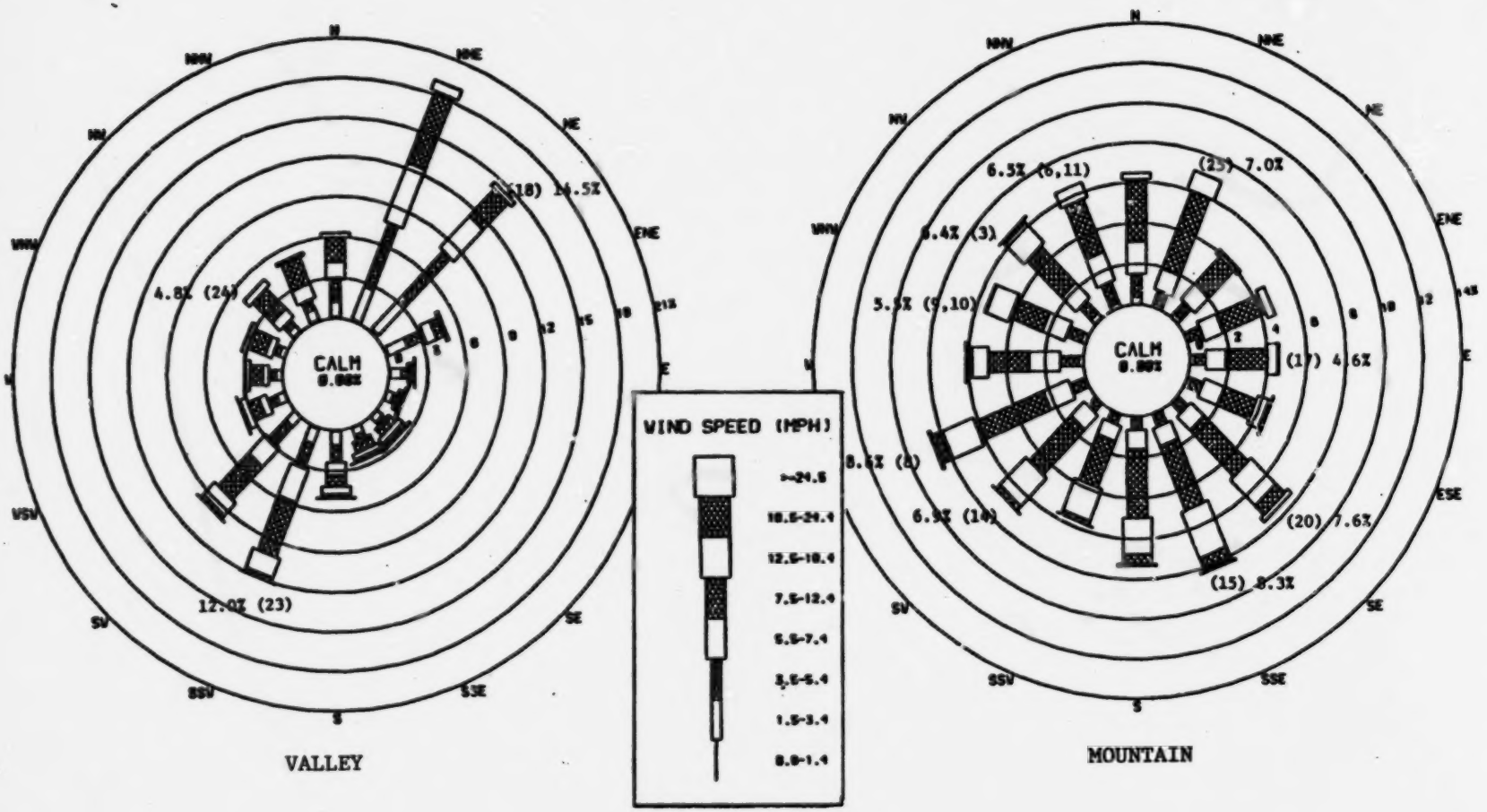

( ) STATION NUMBERS

Figure 7. THE PERCENTAGE OF TIME EXISTING MONITORS WERE DOWNWIND OF THE WIDOWS CREEK STEAM PLANT JANUARY 1, 1978–DECEMBER 31, 1979

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Table 1

SO_2 MONITORING DATA - WIDOWS CREEK STEAM PLANT
JANUARY 1, 1978 - DECEMBER 31, 1979

(A)
MAXIMUM AND SECOND HIGHEST 3- and 24-HOUR AVERAGE SO_2 CONCENTRATIONS

Station Number	3-Hour 1978 Max	3-Hour 1978 2nd	3-Hour 1979 Max	3-Hour 1979 2nd	3-Hour Average[a] (ppm)	24-Hour 1978 Max	24-Hour 1978 2nd	24-Hour 1979 Max	24-Hour 1979 2nd	24-Hour Average[a] (ppm)
3	.48	.42	.37	.33	.40	.07	.07	.07	.06	.07
6	.35	.34	.47	.32	.37	.05	.05	.07	.06	.06
8	.34	.30	.39	.38	.35	.07	.06	.09	.07	.07
9	.45	.38	.61	.43	.47	.07	.06	.10	.08	.08
10	.39	.37	.33	.28	.34	.06	.05	.07	.06	.06
11	.55	.41	.94	.55	.61	.09	.08	.13	.10	.10
14	.48	.48	.54	.38	.47	.11	.10	.15	.09	.11
15	.39	.37	.22	.16	.29	.07	.07	.05	.04	.06
17	.25	.18	.10	.09	.16	.06	.03	.04	.03	.04
18	.27	.17	.16	.11	.18	.05	.04	.05	.04	.05
20[b]	--	--	.15	.11	.13	--	--	.03	.03	.03
23	.24	.19	.15	.14	.18	.04	.04	.03	.03	.04
24	.28	.27	.30	.27	.28	.06	.05	.05	.05	.05
25	.34	.22	.59	.58	.43	.06	.05	.16	.10	.09

a. Average of all values shown.
b. Station was added to the monitoring system in 1979.

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Table 1 (Continued)

(B)

FREQUENCY OF 3- AND 24-HOUR AVERAGE SO_2 CONCENTRATIONS

Station Number	3-Hour Frequencies (%>0.15 ppm) 1978	1979	Avg.	24-Hour Frequencies (%>0.040 ppm) 1978	1979	Avg.
3	.95	.96	.96	2.75	4.65	3.70
6	.77	.91	.84	2.79	3.26	3.03
8	.88	1.15	1.02	3.31	4.40	3.86
9	.63	1.05	.84	1.65	4.71	3.18
10	.54	.72	.63	1.64	2.83	3.24
11	.68	.64	.66	1.68	2.82	2.25
14	1.22	1.32	1.27	4.67	3.69	4.18
15	.61	.22	.42	2.47	1.14	1.81
17	.12	.00	.06	.29	.36	.33
18	.11	.05	.08	.60	.28	.44
20[b]	--	.08	.08	--	.72	.72
23	.33	.17	.25	.55	.00	.28
24	.69	.48	.59	.55	.60	.58
25	.36	.76	.56	1.39	2.96	2.18

(C)

NUMBER OF 3- AND 24-HOUR NAAQS EXCEEDANCES RECORDED

Station Number	1978 3-hr	1978 24-hr	1979 3-hr	1979 24-hr	Total
3	0	0	0	0	0
6	0	0	0	0	0
8	0	0	0	0	0
9	0	0	1	0	1
10	0	0	0	0	0
11	1	0	2	0	3
14	0	0	1	1	2
15	0	0	0	0	0
17	0	0	0	0	0
18	0	0	0	0	0
20	-	0	0	0	0
23	0	0	0	0	0
24	0	0	0	0	0
25	0	0	2	1	3

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Table 2

RANKING OF THE EFFECTIVENESS OF AMBIENT AIR QUALITY MONITORING STATIONS IN THE VICINITY OF THE WIDOWS CREEK STEAM PLANT
JANUARY 1, 1978 - DECEMBER 31, 1979

Factor	Maximum Weight	Monitoring Station Value													
		3	6	8	9	10	11	14	15	17	18	20	23	24	25
A. Monitor-Average 3-hour Concentration	15	9	8	7	11	7	15	11	5	1	2	0	2	5	10
A. Monitor-Average 24-Hour Concentration	15	8	6	8	10	6	14	15	6	2	4	0	2	4	12
B. Monitor-Average 3-Hour Frequency	15	12	10	12	10	8	8	15	8	0	3	4	5	7	7
B. Monitor-Average 24-Hour Frequency	15	11	9	15	10	8	7	15	7	0	1	5	2	4	7
C. Excesses NAAQS	15	0	0	0	5	0	15	10	0	0	0	0	0	0	15
D. Located in or Near Area of Botanical Impact	15	8	0	0	15	15	8	8	0	0	0	0	0	0	8
E. Monitor-Downwind Sector	10	2	2	5	1	1	2	3	3	1	10	3	7	0	2
Total	100	50	35	47	62	45	69	77	29	4	20	12	18	20	61
Rank		5	8	6	3	7	2	1	9	13	10	12	11	10	4

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Proposed Network

Based on the results of the modeling study and the evaluation of the existing monitoring stations, the network shown in figure 8 is proposed for immediate implementation. The network consists of five stations, three of which will be retained from the existing network and two new stations.

Existing stations 9, 14 and 25 were retained because of their effectiveness in measuring maximum SO_2 concentrations with a high degree of frequency and because they were located in or close to areas of high SO_2 concentrations predicted by the modeling study. Station P-1 was selected to document predicted air quality impacts from both the Widows Creek and the Mead Corporation plants. Station P-2 was chosen to measure predicted high 3-hour average SO_2 concentrations for stability class A and to document downwash conditions that occur close to the steam plant under certain high wind situations. Station 11 was not retained because of the close proximity of a station operated by the State of Alabama.

In developing the revised monitoring plan, consideration was given to the need for measuring pollutant levels in nearby population centers. A review of available monitoring data and modeling estimates showed that air quality levels in the towns of Bridgeport and Stevenson, Alabama, would be much lower than that expected at other sites selected and would be appreciably below ambient air quality standards. For this reason monitoring stations were not sited in either of these towns.

The proposed network shown in figure 8 consists of existing stations 9, 14, 25, and the two new sites P-1 and P-2. Table 3 summarizes the objectives fulfilled by the proposed network. The decision to employ five stations for the recommended network at Widows Creek has involved decisions about several subjective and practical factors.[4] While there is no substitute for "saturating" the plant's area of influence to obtain complete coverage, it is obvious for reasons of economy that such an approach is cost prohibitive. The monitoring plan recommended herein considers all relevant factors and should satisfy current objectives for ambient monitoring at Widows Creek Steam Plant.[4]

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4. The proposal of a specific site is made contingent upon the availability of a suitable plot of land and the arrangement of lease rights for its use. Certain practical considerations (i.e., availability of power) may require some slight modifications to the recommended network.

5. Monitoring data from stations P-1 and P-2 will be examined three years after the initiation of this proposed network. If these stations are not impacted by the high SO_2 concentrations that were predicted under "A" stability, these stations will be terminated.

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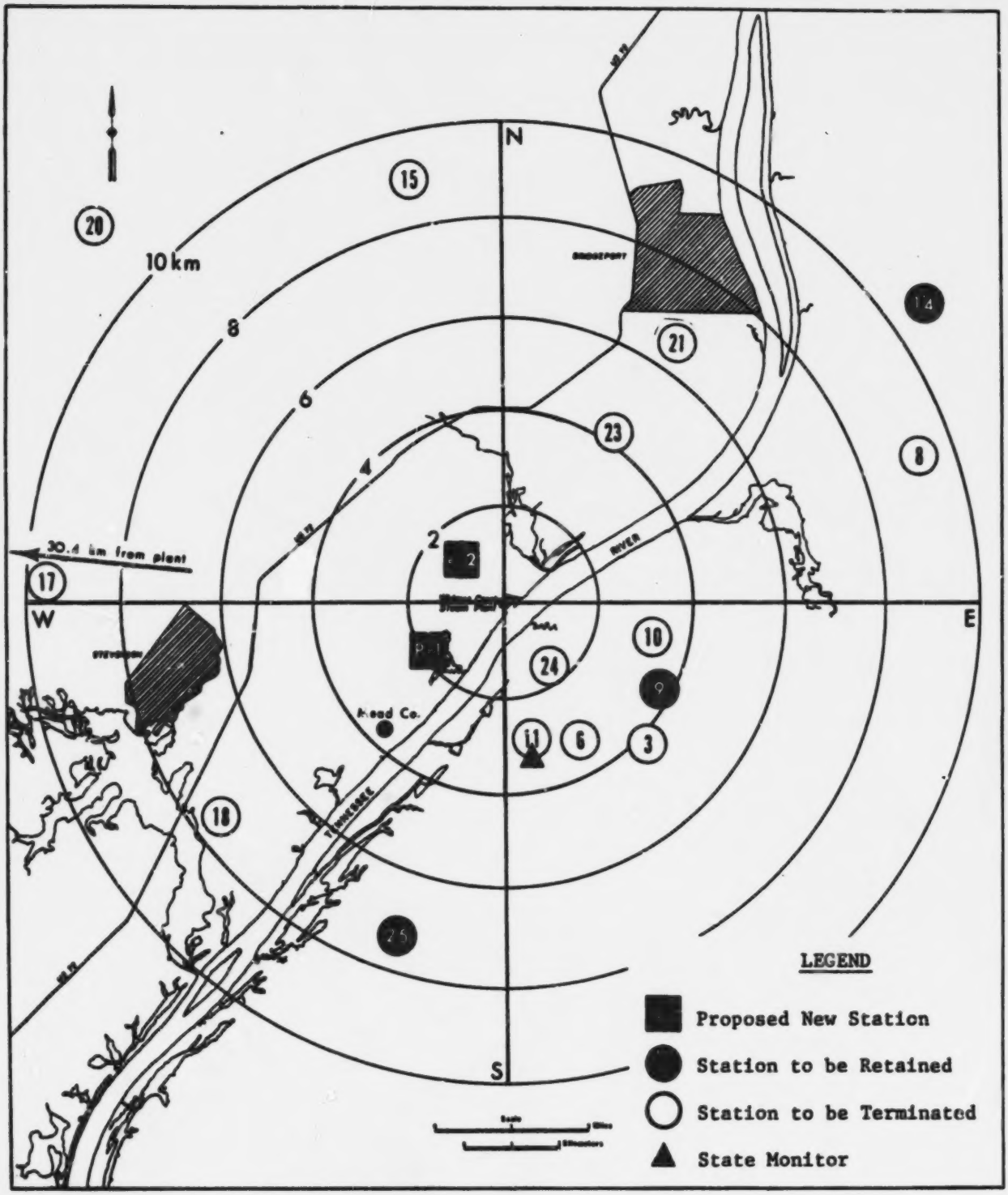

Figure 8. LOCATION OF STATIONS IN THE PROPOSED AMBIENT AIR QUALITY MONITORING NETWORK AT THE WIDOWS CREEK STEAM PLANT

Table 3

MONITORING OBJECTIVES ACHIEVED BY THE PROPOSED NETWORK

Station	Monitors	Distance (km)	Direction (°)	Monitor Objectives Achieved
P-1	SO_2 & TSP	1.4	210	Predicted area of high 3-hour average SO_2 concentrations for unstable conditions, impact from other sources.
P-2	SO_2	1.5	315	Predicted area of high 3-hour average SO_2 concentrations, to document downwash conditions during high wind situations.
9	SO_2	3.5	118	High 3- and 24-hour average SO_2 concentrations with high degree of frequency, predicted area of high 24-hour SO_2 concentrations for stable conditions.
14	SO_2 & TSP	10.6	054	High 3- and 24-hour average SO_2 concentrations with high degree of frequency, predicted area of high 24-hour SO_2 concentrations for stable conditions.
25	SO_2 & TSP	7.3	192	High 3- and 24-hour average SO_2 concentrations with high degree of frequency, predicted area of high 3- and 24-hour SO_2 concentrations for stable and unstable conditions.

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APPENDIX A

Alabama Air Pollution Control Regulations and Letters from EPA Approving TVA SO_2 and TSP Monitoring Methods

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APPENDIX A

ALABAMA
AIR POLLUTION CONTROL COMMISSION

RULES AND REGULATIONS

REVISED FEBRUARY 13, 1980

All regulations were adopted by the Alabama Air Pollution Control Commission on January 18, 1972, unless otherwise noted. Annotations are not a part of the regulations. An original copy of the resolution of the Alabama Air Pollution Control Commission adopting the original regulations and amendments thereto is available for public inspection and copying in the office of the Alabama Air Pollution Control Commission, 645 South McDonough Street, Montgomery, AL 36130.

APPENDIX A

CHAPTER 5 - CONTROL OF
SULFUR COMPOUND EMISSIONS
(Amended May 29, 1973)

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5.1 Fuel Combustion.

5.1.1(a) Sulfur Dioxide Category I Counties. No person shall cause or permit the operation of a fuel burning installation in a Sulfur Dioxide Category I County or in Jefferson County in such a manner that sulfur oxides, measured as sulfur dioxide, are emitted in excess of 1.8 pounds per million BTU heat input. (Amended March 25, 1975)

(b) Sulfur Dioxide Category II Counties. No person shall cause or permit the operation of a fuel burning installation in a Sulfur Dioxide Category II County in such a manner that sulfur oxides, measured as sulfur dioxide, are emitted in excess of 4.0 pounds per million BTU heat input. (Amended March 25, 1975)

(c) Sulfur Dioxide - Jackson County. No person shall cause or permit the operation of an electric utility steam generating installation having a total rated capacity greater than 5,000 million BTU per hour in Jackson County in such a manner that sulfur oxides, measured as sulfur dioxide, are emitted in excess of 1.2 pounds per million BTU heat input. (Adopted August 28, 1979)

5.1.2 Air Quality Demonstration. In addition to the requirements of Section 5.1.1, every owner or operator of a fuel burning installation having a total rated capacity greater than 1500 million BTU per hour shall:

(a) Demonstrate, to the satisfaction of the Director, that the sulfur oxides emitted, either alone or in contribution to other sources, will not interfere with attainment and maintenance of any primary or secondary ambient air quality standard prescribed at Part 1.6.

(b) Demonstrate, to the satisfaction of the Director, that in meeting the emission limitations of Section 5.1.1, the installation will not increase emissions to the extent that resulting air quality concentrations will be greater than:

(i) those concentrations (either measured or calculated) which existed in 1970; or

(ii) those concentrations (either measured or calculated) which existed during the first year of operation of any installation which began operating after January 1, 1970.

(c) Upon the direction of the Director, install and maintain air quality sensors to monitor attainment and maintenance of ambient air quality standards in the areas influenced by the emissions from such installation. Results of such monitoring shall be provided to the Director in a manner and form as he shall direct.

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5.1.3 For purposes of this Part, the total heat input from all similar fuel combustion units at a plant, premises, or installation shall be used for determining the maximum allowable emission of sulfur dioxide that passes through a stack or stacks. Units constructed and operated to conform with the New Source Performance Standards shall not be considered similar to other units at a plant, premises, or installation. (Amended March 25, 1975)

5.1.4 All calculations performed pursuant to demonstrations required by Section 5.1.2 shall assume that the fuel burning installation is operating at or above the maximum capacity which such installation is capable of being operated.

5.1.5 No person shall cause or permit the emission or combustion of any refinery process gas stream that contains H_2S in concentrations greater than 150 ppm without removal of the hydrogen sulfide in excess of this concentration.

5.1.6 To ensure that ambient air quality standards are met, an annual review of Sulfur Dioxide Category I and II Counties will be made by the staff. Initial Sulfur Dioxide Category classifications and any subsequent changes to Sulfur Dioxide Category classifications will be the subject of a public hearing. (Amended March 25, 1975)

5.2 Sulfuric Acid Plants. (Amended April 22, 1975)

5.2.1 Applicability. This Section applies to existing sulfuric acid plants operating as of January 18, 1972.

(a) No person shall cause or permit sulfur dioxide tail gas emissions from sulfuric acid manufacturing plants to exceed 27 pounds per ton of 100 percent sulfuric acid produced; provided, however, that no sulfuric acid manufacturing plant emitting less than 27 pounds per ton of 100 percent sulfuric acid produced shall be allowed to increase its emission rate.

(b) No person shall cause or permit tail gas acid mist emissions to exceed 0.5 pounds per ton of sulfuric acid produced, and the sulfur trioxide emissions are not to exceed 0.2 pounds per ton of sulfuric acid produced.

5.2.2 Applicability. This Section applies to all sulfuric acid plants not included in Section 5.2.1.

(a) No person shall cause or permit the discharge into the atmosphere of sulfur dioxide in excess of 4 pounds per ton of sulfuric acid produced, maximum two-hour average.

(b) No person shall cause or permit the discharge into the atmosphere of acid mist which is in excess of 0.15 pounds per ton of acid produced, maximum two-hour average, expressed as H_2SO_4.

5.2.3 There shall be installed, calibrated, maintained, and operated in any sulfuric acid production unit subject to the provi-

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY
RESEARCH TRIANGLE PARK
NORTH CAROLINA 27711

November 8, 1979

John P. Blackwell
Chief, Air Quality Branch
Tennessee Valley Authority
River Oaks Building
Muscle Shoals, AL 35660

RE: Request for approval to operate designated SO_2 analyzers on nonconforming ranges.

Dear Mr. Blackwell:

This is in response to your October 8, 1979 request for approval to operate approximately 105 designated Philips PW 9700 SO_2 analyzers on ranges of 0-1, 0-2 and 0-5 ppm at various indentified sites in the TVA area.

We note your understanding that your monitoring is not subject to the SLAMS regulations, and we respect your desire to voluntarily comply with those regulations.

Request for 0-1 ppm range approval:

This letter shall constitute approval under section 2.5 of 40 CFR Part 58, Appendix C for your agency to operate any of the Philips PW 9700 SO_2 analyzers identified in your request on a range of 0-1 ppm.

Request for 0-2 ppm range approval:

Use of the 0-2 ppm range for those analyzers so identified in your submitted schedule is hereby approved under section 2.6.2 of 40 CFR Part 58, Appendix C subject to the following conditions:

1. that the resolution (smallest change in concentration that can be measured) is adequate for the intended objective of the monitoring and particularly if the measurements will be used in long-term averages to compare with the .03 ppm annual arithmetic mean primary standard;

2. that the analyzers will be used on the 2 ppm range only in the geographical area specified in the request for approval;

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3. that the conditions leading to SO_2 concentrations or the likelihood of concentrations over 1 ppm continue to exist in the specified geographical area; and

4. that the data quality control and quality assessment procedures required by Appendix A of 40 CFR Part 58 or other applicable quality assurance requirements are appropriately adapted to the 2 ppm range.

Please notify this office within 30 days of any change in the above conditions which might affect this approval.

Request for 0-5 ppm range approval:

In regard to operation on a 0-5 ppm range, we are highly concerned about the effective resolution of the overall measurement system, including the analyzers as well as the measurement recording device. The attached letter to the Arizona Department of Health Services describes our concerns more detail and specifies the conditions under which we will consider approval. We also must consider the fact that changing range on the Philips PW9700 analyzer affects the chemical equilibrium of the measurement cell and may thus affect analyzer performance.

In view of these circumstances, we cannot approve any analyzer on a 0-5 ppm range until we have more information about the operation of the specific analyzers proposed for 0-5 ppm operation. Therefore, under section 2.7.5 of 40 CFR Part 58, Appendix C, we request additional information in the following areas:

1. The specific use or limits that will be put on the use of the measurements obtained with analyzers operating on the 0-5 ppm range;

2. The effect of the 0-5 ppm range on the performance of the Philips PW9700 SO_2 analyzer compared with its performance on the 0-0.5 ppm or 0-1 ppm range;

3. The type of data recording device or system that will be used and rationale supporting the adequacy of the overall resolution of the measurement system with respect to item 1; and

4. The nature and extent of quality assurance procedures that would be used with the 0-5 ppm range.

Department E will be available to discuss this determination or any of the issues with you further if you desire.

Sincerely yours,

Larry J. Purdue
Department E (MD-77)
Methods Standardization Branch
Quality Assurance Division

11/13/79--RVC:HH
mc: C. H. Smith, 350 EB-N
N. T. Lee, 124F ROB-N
A. E. Owen, 124D ROB-

cc: Doyle T. Brittain,
EPA, Region IV

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
ENVIRONMENTAL MONITORING AND SUPPORT LABORATORY
RESEARCH TRIANGLE PARK
NORTH CAROLINA 27711

April 10, 1980

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Mr. John P. Blackwell
Chief, Air Quality Branch
Tennessee Valley Authority
River Oaks Building (Room 100A)
Muscle Shoals, Alabama 35660

Dear Mr. Blackwell:

Your proposed modifications to the Federal reference method for measuring total suspended particulates in the atmosphere, consisting of (1) replacing the rotameter with an orifice plate and differential pressure gage as the flow rate measuring device, and (2) modifying the calibration method to use a precision flow orifice calibrated by water flow as the flow standard, as detailed in your request dated March 19, 1980, is hereby approved. No special approval is necessary for the use of constant flow controllers.

Sincerely yours,

Larry J. Purdue
Methods Standardization Branch
Quality Assurance Division

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